

B777 Normal Procedures

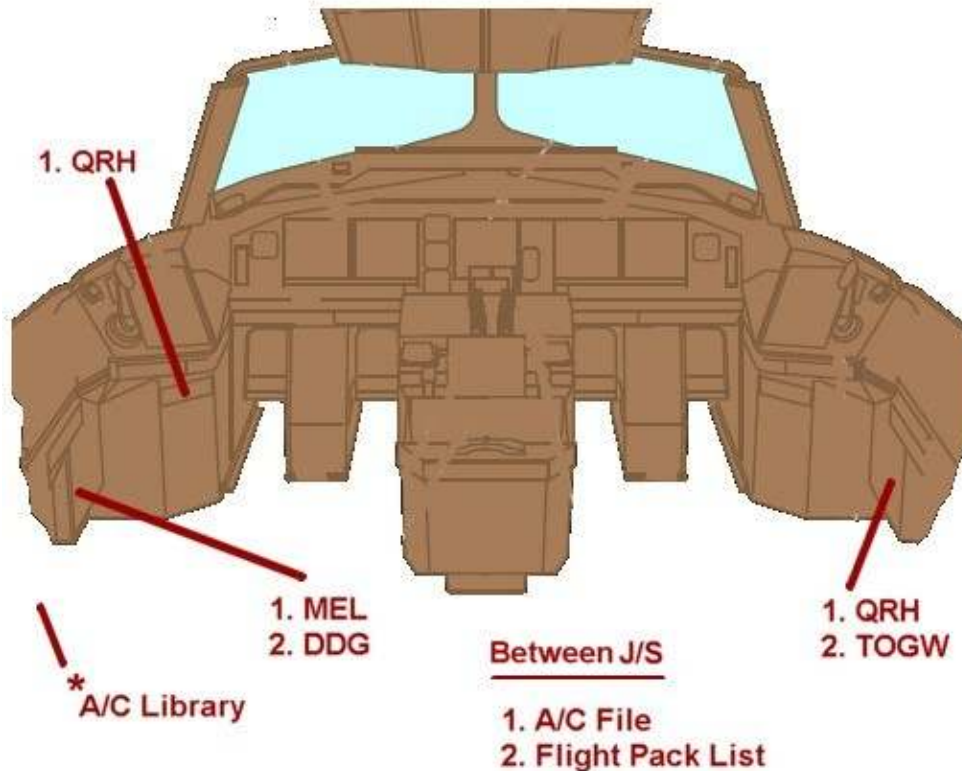
(Notes based on Boeing and PIA SOP)

Last Updated 21st Feb 2014

Preflight Summary	
1. Electrical Power Up	6. Exterior Inspection
2. Aircraft Documents	7. Preflight Procedure
3. Preliminary Preflight Procedure	8. Takeoff Performance
4. ATIS	9. Briefing
5. CDU Preflight	10. Checklist

Electrical Power Up: To be done through “Supplementary Procedures” if required.

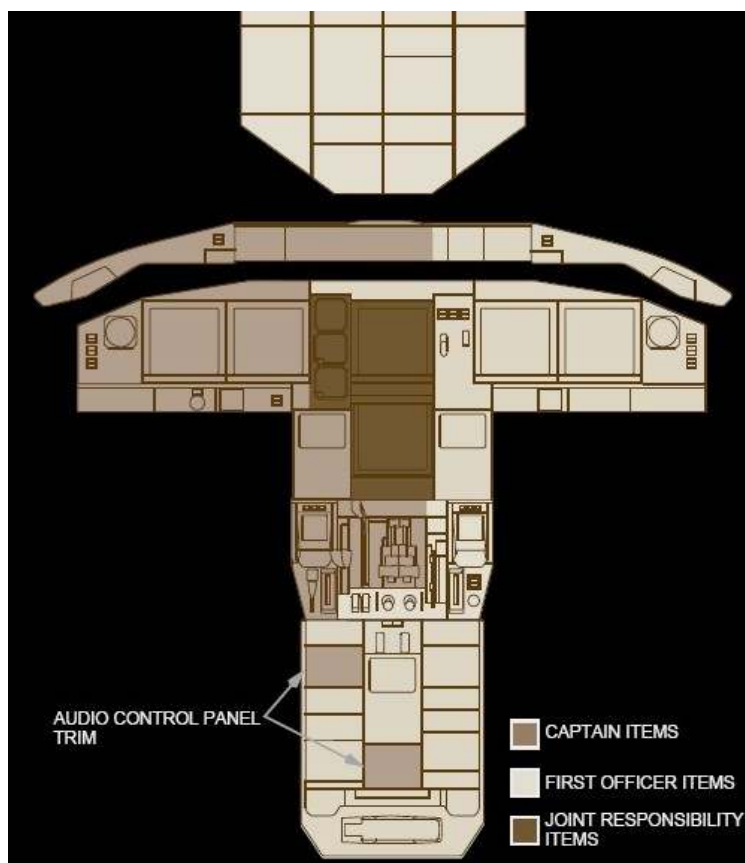
A/C Documents Location



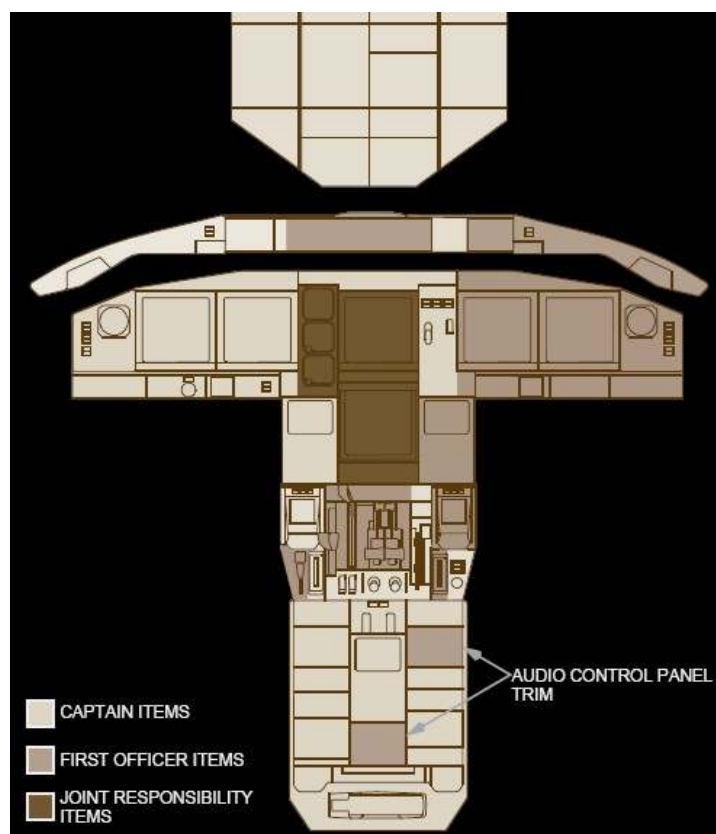
* A file containing a list of required manuals/books to be on board needs to be checked. Latest revision file has to be updated within the past 10 days.

Misc	1	Technical Log Book
	2	Flight Log
	3	Captain's Debrief
	4	Route Manuals

Areas of Responsibility - Captain as Pilot Flying or Taxiing



Areas of Responsibility - First Officer as Pilot Flying or Taxiing



Preliminary Preflight Procedure – Captain or First Officer

The Preliminary Preflight Procedure assumes that the Electrical Power Up supplementary procedure is complete.

To be Done on Every Sector

A An All	ADIRU switch - OFF 30 seconds, then ON	Verify ON BAT light and OFF light extinguished
S Sector	STATUS	Expected messages only Oxygen pressure Hydraulic quantity
E Exercise	ENG	Engine oil quantity

To be Done After Crew Change or Maintenance Action

Maintenance documents	Check
FLIGHT DECK ACCESS SYSTEM switch	Guard closed
Emergency Equipment	Fire extinguisher – Checked and stowed Crash axe – Stowed Escape ropes – Stowed Other – (life vest etc) Checked and stowed
Overhead Maintenance Panel	Guards closed Lights extinguished CARGO TEMPERATURE selectors as needed
Circuit Breakers	Check
Parking Brake *	As Needed

* Verify EICAS memo message PARKING BRAKE SET. Do not assume that the parking brake will prevent airplane movement. Accumulator pressure can be insufficient.

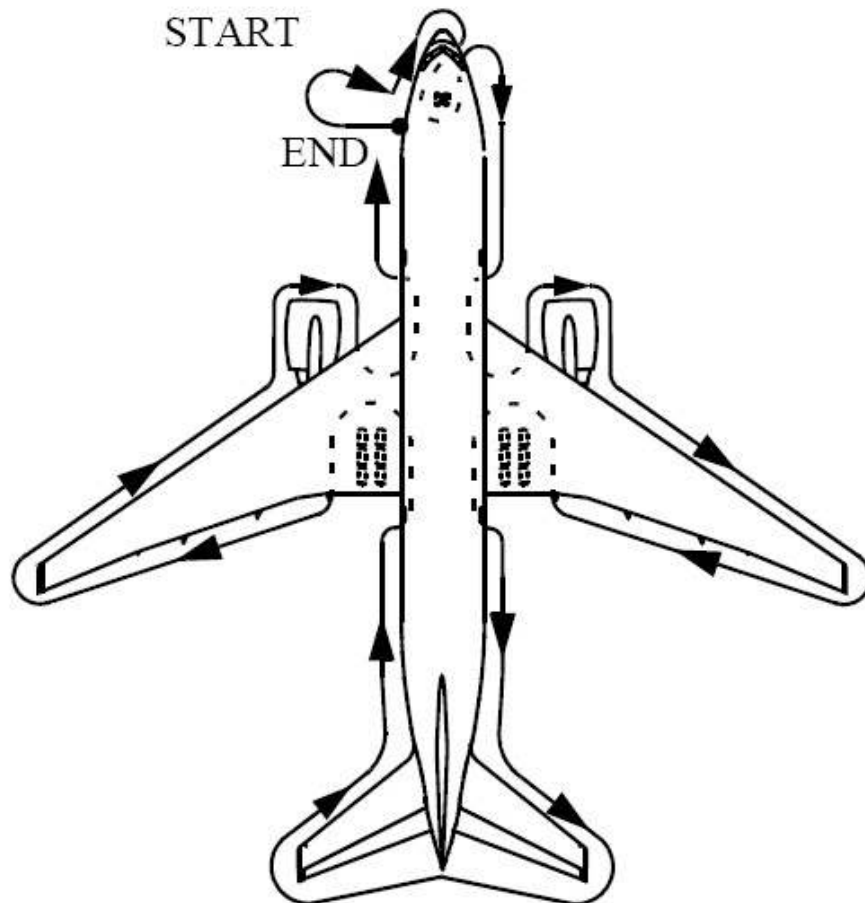
ATIS

CDU Preflight Procedure - Captain and First Officer

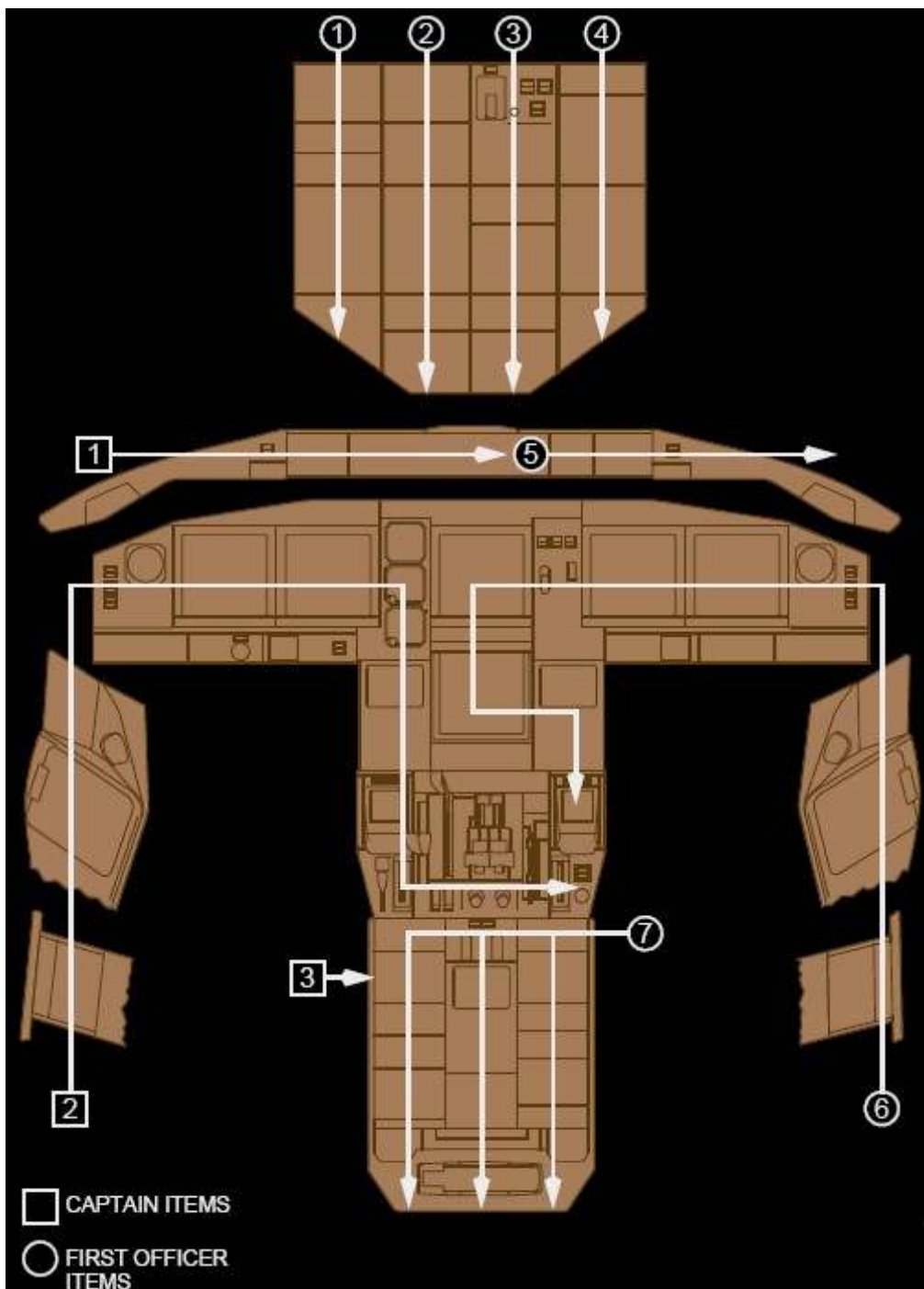
See FMC Preflight (<http://www.theairlinepilots.com/forum/viewtopic.php?t=747>)

On TAKEOFF REF page, make data entries on page 2/2 before page 1/2.

Exterior Inspection



Preflight Procedure – Captain and First Officer



Note: Before performing any preflight procedures, move the FMC selector switch to either L or R, then back to AUTO. If this cycling is inadvertently overlooked prior to preflight, it can be done in flight at any time. [Ref: Flight Crew Operation Manual Bulletin (PIA-51) for Un-commanded Autothrottle Movement During Cruise Flight]

1) PFD:

- FMA:
Auto-throttle mode blank
Roll mode TO/GA
Pitch mode TO/GA
AFDS status FLT DIR
- No flags except “NO VSPD” until takeoff V-speeds are selected.
- Altitude Readings: Note down on master document (RVSM requirement).

2) ND: No flags except “TCAS OFF”

3) EICAS Screen:

Non appearance of any of the following Five Messages is a clue that something has been left out while carrying out the preflight preparation:

- Parking Brake
- Autobrake
- APU
- Doors
- Seatbelts Sign

4) MFD:

- Secondary ENGINE indications
- STATUS - Check messages.
- CHECKLIST - RESET ALL

5) FMC

- RTE 2 (alternative route, different DEP / RW, or in-flight return route if required)
- Cost Index 180
- Check NAV RAD and POS REF Page to clear values if previously entered.
- Enter all Step Climbs from CFP
- Route Data: W/V and FL Temperature (starting at first waypoint after TOC). Subsequent wind data should be entered for a change greater than 10 deg or 10 knots and change in cruise level. Enter temperature changes equal to or greater than 2 deg.
- After execution of route, completion of initialization pages and completion of fuelling, enter the estimated ZFW to check estimated TOGW. Also check the total distance & fuel remaining at destination on progress page. Cross check it against the CFP.

6) Configuration Check: If there is an incorrect configuration or response:

- Verify that the system controls are set correctly.
- Check the respective circuit breaker.
- Test the respective system light as required.

Departure Briefing

1. Weather and Notams.
2. VHF Communication Frequencies to be used / set.
3. Push and Start up Procedures.
4. Taxi routing to the runway in use.
5. Runway Information:
 - **D** – Dimensions (Length, Width, Stopway)
 - **S** – Surface Condition
 - **L** – Lighting
6. Take off Procedure:
 - Thrust Setting (e.g. TO-2 SEL 45)
 - Configuration (e.g. Flaps 5)
 - Packs (e.g. on APU)
 - Anti-ice (e.g. On)
 - Noise Abatement Procedure (if any)
 - Thrust Reduction (1000 ft or as required)
 - Acceleration - 2 Eng (3000 ft or as required)
 - Acceleration – 1 Eng (1000 ft or as required)
7. SID Procedure:
 - Nav Frequencies to be used.
 - Routing and Constraints
 - Transition Altitude
 - MSA
 - First Cleared Level
8. Communication Failure Procedure
9. Miscellaneous:
 - Weather after takeoff, use of Wx radar / terrain function etc.

Takeoff Briefing by Captain

Capt as PF:

Call out any malfunction or warning and silence the aural warning.

I will call "STOP" or "GO"

I will reject takeoff for any warning or condition that significantly affects the safety of the flight.

Before 80 knots: Takeoff will be rejected for:

- Takeoff configuration warning
- System failure(s)
- Activation of the master caution system
- Tire failure
- Unusual noise or vibration
- Abnormally slow acceleration
- If a side window opens
- Fire or fire warning
- Engine failure
- Predictive windshear warning
- If the airplane is unsafe or unable to fly

Between 80 knots and V1: Takeoff will be rejected for:

- Fire or fire warning
- Engine failure
- Predictive windshear warning
- If the airplane is unsafe or unable to fly

After V1: Takeoff will be continued:

- No action will be taken below 400 feet AGL other than:
 - > Application of TOGA.
 - > Silencing of Aural Warning.

If F/O is PF the briefing will include:

I will have control of the thrust levers for take off.

If I call "STOP", I will take over control and reject the take off.

If I call "GO", you will continue the take off until I say "I HAVE CONTROLS".

Checklist	Call	Read	Verify	Respond
PREFLIGHT	Captain	First officer	Both	Area of responsibility
Oxygen.....			Tested, 100%	Both
Flight instruments		Heading___, Altimeter___		Both
Parking brake			Set	Capt
Fuel control switches.....			CUTOFF	Capt

Load and Trim Sheet

- Max allowable difference between AZFW and EZFW is 7000 Kgs before a new trim is required.

Ref: OETB 25th September 2008

- Last Minute Change (LMC): [Ref: PIA Weight and Balance Booklet – Page 00.06]

a) No change in CG is required if Passenger or Weight Changes (loading/off-loading) are:

4 passengers with baggage anywhere and 400 Kg load in any lower hold.

Only ZFW, TOGW and Total SOULS ON BOARD figures have to be revised.

b) If changes on computerized load sheet are more than those specified above, fresh load sheet is required to be prepared.

c) If last minute changes on Manual load sheet are more than those specified above, follow the detailed LMC procedure (page 00.06 and 00.07).

- ZFW and TOCG** will be inserted in the FMC.
- FMC figures of **Total Fuel, TOGW and Stab Trim** will be reconfirmed.
- An average of TOCG & ZFWCG will be inserted in the CRUISE CG space on the PERF INIT page.
- If EFB performance calculating speeds are higher, they must be inserted in the FMS.

TOTAL TRAFFIC LOAD	34402		
DRY OPERATING WEIGHT	147171		
ZERO FUEL WEIGHT ACTUAL	181573	MAX	199580
TAKE OFF FUEL	17400		
TAKE OFF WEIGHT ACTUAL	198973	MAX	273969
TRIP FUEL	9906		
LANDING WEIGHT ACTUAL	189067	MAX	213188
TAXI OUT FUEL	700		
LAST			
BALANCE AND SEATING CONDITIONS DEST SPEC			
BI	32.8 DOI		32.3
LIZFW	39.9 MACZFW		25.5
LITOW	39.9 MACTOW		25.9

Before Start Procedure

F/O Do Items

- 1) Close all the doors and windows and make the departure announcement.
- 2) Set the CDU.
- 3) After ATC clearance, set the overhead panel (fuel and hydraulic) and turn on the beacon.
- 4) Check Recall.

Flight Deck Door	Closed and Lock
CDU Display	PF – Takeoff Ref Page PM – Legs Page
Exterior Doors	Closed * (make the departure announcement)
Flight Deck Windows	Closed and Lock
ATC Clearance	To Start Engines
Hydraulic Panel	Set **
Fuel Panel	Set ***
Beacon Light Switch	ON
Cancel/Recall Switch	Only expected alert messages should show ****

* Confirm through the door synoptic

** If the tow bar is connected, do not pressurize the hydraulic systems until the nose gear steering is locked out. Unwanted tow bar movement can occur. Pressurize the right system first to prevent fluid transfer between systems.

*** Center tank pumps ON if there is more than 4,800 kilograms of fuel in the center tank.

**** For unexpected messages, check the DDG and decide if maintenance is needed.

Captain Do Items

- 1) Close the window.
- 2) Set the CDU and MCP.
- 3) Ground Clearance: Nose gear steering locked out + Hydraulic Pressurization.
- 4) Set the stabilizer trim.

CDU Display	PF – Takeoff Ref Page PM – Legs Page
MCP Set	V2 LNAV VNAV Heading/Track Altitude
Flight Deck Windows	Closed and Lock
Coordination with Ground	External Power / Tug Master - As required
	Hydraulics – Clearance to Pressurize
	Nose Gear Steering - Locked Out for Pushback
Trim	Set

Checklist	Call	Read	Verify	Respond
BEFORE START	Captain	First officer	Both	Area of responsibility
Flight deck door	Closed and locked			FO
Passenger signs	___			FO
MCP	V2___, HDG/TRK___, ALTITUDE___			Capt
Takeoff speeds	V1___, VR___, V2___			Capt
CDU preflight.	Completed			Both
Trim	___ Units, 0, 0			Capt
Taxi and takeoff briefing	Completed			Capt
Beacon.....	ON			FO

Pushback or Towing Procedure

Captain	F/O
Communication with ground	
Parking brake as directed by ground*	
Timer **	
After Pushback Tow bar - Verify NOT connected Nose Gear Steering – Verify NOT locked out	Transponder – As Needed

* Do not hold or turn the nose wheel tiller during pushback or towing. Do not use airplane brakes to stop the airplane during pushback or towing.

** When commencing pushback CM1 will start the elapsed time function of the clock (Ref: FOM 16.4.3)

Engine Start Procedure

Captain	F/O
	Secondary Engine Display
Announce Start Sequence	
Call Start ____ Engine	
	Engine Start/Ignition Selector – START
Fuel Control Switch – RUN	
Verify Oil Pressure Increase *	

* Auto start does not monitor oil pressure and temperature. Do the ABORTED ENGINE START checklist if there is no oil pressure indication after the EGT increases.

Note: During or after engine start if there is an alert message then do the respective non-normal checklist and check the DDG (on ground). After engine start, there is no need to check status messages. Any message that has an adverse affect on safe continuation of the flight appears as an EICAS alert message.

Before Taxi Procedure

A – APU, Anti-ice and Area clear
F – Flaps and Flight Controls Check
T – Transponder

B – Briefing
E – EICAS and EFB
L – Lights

Captain	F/O
	APU – OFF
	Engine Anti-Ice – As Needed
Verify Ground Equipment Clear *	Verify Ground Equipment Clear *
Call for Takeoff Flaps	Set Takeoff Flaps
Flight Controls Check **	
	Transponder – As needed
Recall Check	Push Cancel/Recall Switch Recall Check
EFB Airport Map – Set ***	EFB Airport Map – Set ***
Call for Before Taxi Checklist	Do the Before Taxi Checklist
	Taxi Clearance
Update changes to taxi briefing if required	
Exterior Lights – As Required	Set on captain's command

* After start, captain will ensure removal of all ground connection, display of nose wheel steering bypass pin, and hand signal (R or L). Taxi will be commenced after announcement of “**Clear my side**” by both pilots and “**Hand signal / by pass pin sighted**”.

** To avoid nuisance FLIGHT CONTROLS faults, a complete cycle of the control wheel during the flight control check should be done slowly (more than approximately 6 seconds) and not combined with the check of the pitch controls.

*** Not to be used as a primary navigation reference. It is designed to aid flight crew positional awareness only.

Checklist	Call	Read	Verify	Respond
BEFORE TAXI	Captain	First officer	Both	Area of responsibility

Anti-ice. **FO**
 Recall. **FO**
 Autobrake **FO**
 Flight controls. **Capt**
 Ground equipment **Capt**

Before Takeoff Procedure

Engine Warm Up: Engine oil temperature must be above the bottom of the temperature scale. Run the engines for at least 3 minutes using a thrust setting normally used for taxi operations.

PF	PM
Weather Radar and Terrain Display as required *	
Takeoff Briefing – Update if needed	Monitor “Cabin Ready” Message
Before Entering Runway	
EFB – Select SID	Cabin Announcement EFB – Select SID
Call for Before Takeoff Checklist	Do the Before Takeoff Checklist

* In case of departure from an airport with surrounding high terrain PM will select “TERRAIN” on his ND.

Checklist	Call	Read	Verify	Respond
BEFORE TAKEOFF	Pilot flying	Pilot monitoring	Both	Pilot flying

Flaps **PF**

Takeoff Procedure

PF		PM
		Strobe ON Transponder On (TA/RA) All Lights ON (After T/O Clearance)
Check Compasses (Runway Heading) and Takeoff Fuel		
<u>Following Items to be done by Captain</u> Announce "Takeoff" N1 – 55% * TOGA		
Verify and Call "Check"		Verify and Call Out FMA Changes
Timer **		
"Check"		Verify and Call "Thrust Set" ***
"Check"		Call "80 Knots"
"Check"		V1 (auto call out)
		VR – Call "Rotate"
Rotate to 15 deg pitch attitude After liftoff follow F/D Commands		
		Positive Rate of climb on Altimeter Call "Positive Rate"
+VE	Verify and call "Gear Up"	Set Gear Up
200	Engage Autopilot	Check PFD & Announce "Autopilot"
		Call "400 feet" (radio altitude)
400	Call / Select – Roll mode	Select / Verify Roll Mode Announce FMA Change
1000	Verify climb thrust set & call "Check"	Call "CLIMB / CLIMB1 / CLIMB2"
3000	Verify Acceleration, Call "Flaps ____"	Call "Speed Checked – Flaps ____"
		After Flaps Retraction Engine Anti-ice AUTO and Lights OFF ****
Select CDU "VNAV" Page Call for After Takeoff Checklist		Do the After Takeoff Checklist

* When engine anti-ice is required and the OAT is 3 deg C or below, the takeoff must be preceded by a static engine run-up to as high a thrust setting as practical.

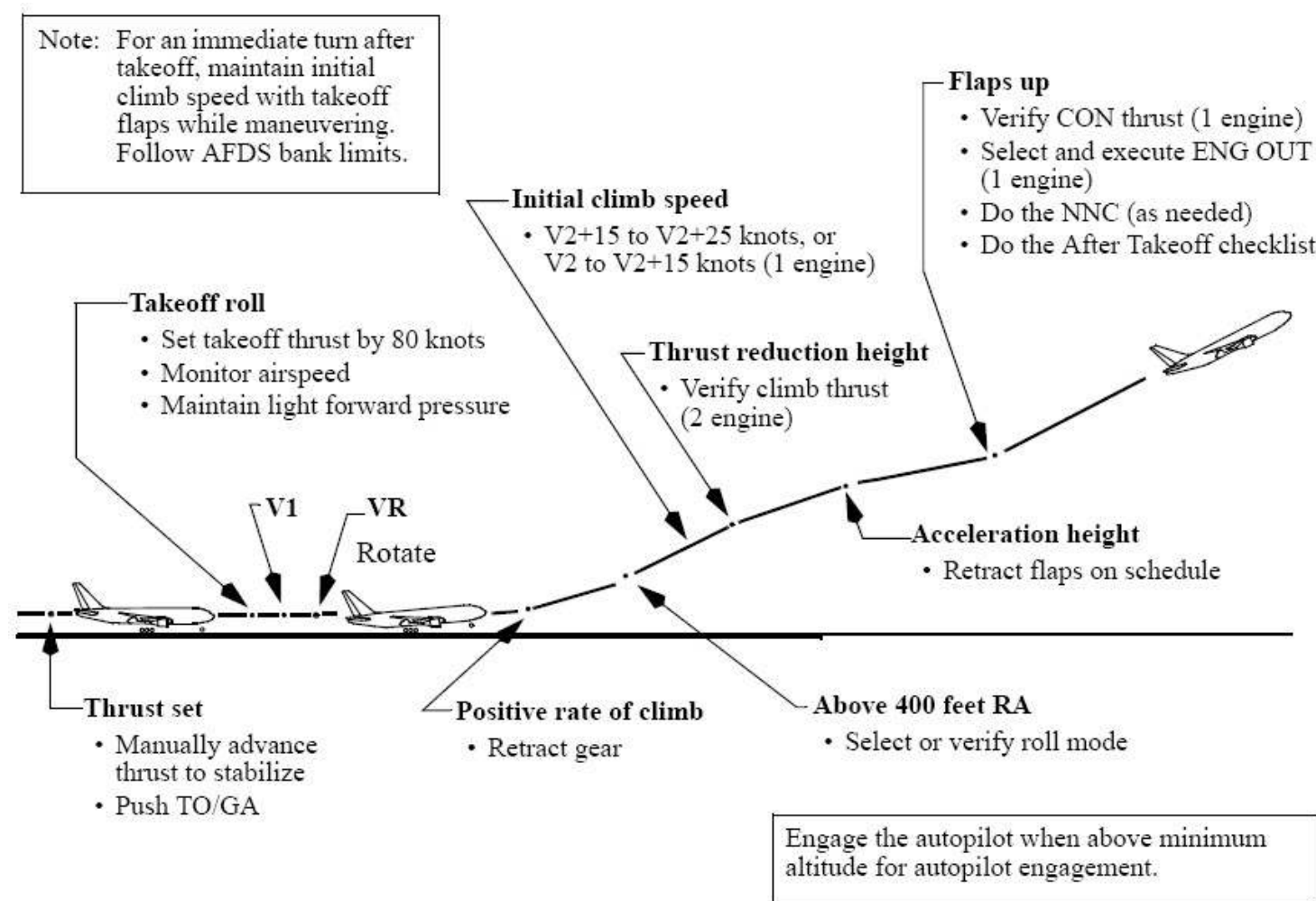
Reduced thrust is not permitted under the following scenarios:

- By the assumed temperature method when the runway is contaminated (Max T/O, T/O 1 or T/O 2 is allowed).
- Wind shear is expected along the take off path (Max T/O thrust is mandatory).
- LVP conditions (Max T/O thrust is recommended).

** At the initiation of takeoff roll, CM2 will start the elapsed time function of the clock (Ref: FOM 16.6.3.4)

*** Monitor engine instruments. During strong headwinds, if the thrust levers do not advance to the planned takeoff thrust, manually advance the thrust levers by 80 knots.

**** After Take off PM will select Turnoff, Nose Landing lights and Taxi light off.



Checklist	Call	Read	Verify	Respond
AFTER TAKEOFF	Pilot flying	Pilot monitoring	Both	Pilot monitoring
Landing gear				UP PM
Flaps				UP PM

Climb Procedure

- 1) Transition Altitude
- 2) Ten Thousand Feet
- 3) Tilt of weather radar Auto or as required

PF	PM
Transition Altitude – Set and Cross Check Altimeters	
	Call “10,000 feet” (AAL) Landing Lights L/R – OFF Passenger Signs – As required
Select “ARPT” (EFIS Control Panel)	
FMC VNAV Page 2 Check Optimum FL – Request ATC	
Approaching Level (check rate of climb)	
	Call “1,000 feet for”

Climb Speed Schedule (If VNAV not in use)

Standard	250 till 10,000 (where required then) 310 / .84
Turbulence	Below 25,000 – 270 At or Above 25,000 – 280/.82 (whichever is lower) *
Vx	FMC max angle speed / Flaps up maneuvering speed
Vy	Flaps up maneuvering speed + 60 kts until intercepting 0.82

* Maintain a min speed of 15 knots above the min maneuvering speed at all altitudes when airspeed is below 0.82 Mach.

Top of Climb

Effective 22 November 2008, the following provision is applicable in ICAO PANS-OPS Doc. 8168 (within or outside RVSM airspace): Pilots should use appropriate procedures by which an airplane climbing or descending to an assigned altitude or flight level, especially with an autopilot engaged, may do so at a rate less than 8 m/s (or **1500 ft/min**) **throughout the last 300 m (or 1000 ft)** of climb or descent to the assigned altitude or flight level **when the pilot is made aware of another aircraft at or approaching an adjacent altitude or flight level**, unless otherwise instructed by ATC. **These procedures are intended to avoid unnecessary airborne collision avoidance system (ACAS II) resolution advisories** in aircraft at or approaching adjacent altitudes or flight levels. **For commercial operations, these procedures should be specified by the operator.** Some European States have published regulations in their Aeronautical Information Publications (AIPs) specifying vertical rates, so it is important to **refer to relevant AIPs for specific information**. (Read more: <http://www.theairlinepilots.com/forumarchive/quickref/acas.pdf>)

PIA FOM - General Flight Rules - 6.5.1 - Level Off: With a high vertical rate, to prevent altitude divergence or undesirable "g" forces while leveling off, rate of climb/descent to be within 500/1000 ft/min (not to exceed 1500 ft/min) in RVSM airspace when approaching the selected altitude or when changing flight levels.

Jeppesen - Air Traffic Control - UK Rules and Procedures – Maximum Rates of Climb and Descent: Aircraft when first approaching a cleared flight level and/or when changing flight level in controlled airspace should ensure that the vertical closure speed is not excessive. It is considered that, with about 1500ft to go to a cleared level, vertical speed should be reduced to a maximum of 1500ft per minute and ideally to between 1000ft per minute and 500ft per minute.

Cruise Procedure

To begin with:

- 1) **R**oute – Copy Active RTE to RTE2.
- 2) **R**udder – Trim as required.
- 3) **R**adar – Tilt as required.

A	Altitude Readings	Note down (hourly) – RVSM requirement
	Additional wind data *	Enter into the FMC RTE DATA page
B	Books	Flight plan, Flight Log & Debrief
C	Copy	Active RTE to RTE2 **
D	Departure Message ***	ZFW, ETA, Delay, Any important message.
E	En route	En route Alternate Weather ****
F	FIR	Entry / Exit Time and Area Procedures
	Fuel Check *****	First waypoint after TOC then at 45 min intervals
G	General	Wx Radar, Aircraft Trimming *****

* For FMC recommended levels. Enter data for at least 3 flight levels:

1) Optimum level 2) One above optimum 3) One below optimum 4) Current level (if different from above)

If no step climb is expected, a single altitude data is sufficient.

** Escape route procedure for decompression in RTE2 where applicable.

*** To central dispatch (KHIASPK) through ACARS.

**** COMM / Company / Message to Ground

Address: TULP11S

Request Format: WXREQ/SA-/OPLA OPRN OPPS/

<http://www.theairlinepilots.com/forumarchive/quickref/wxquery.pdf>

***** Use FMC calculated fuel figure to keep score.

***** Primary Rudder Trim Technique (FCTM 1.24):

- Symmetrical thrust
- Balanced fuel
- HDG SEL or HOLD (stabilized for at least 30 seconds)
- Trim the rudder in the direction corresponding to the down (low) side of the control wheel until the control wheel indicates level. In a proper trim condition, there may be a slight forward slip (slight bank angle indicated on the bank pointer) and a slight deflection of the slip/skid indicator, which is acceptable.

CDU Selection for Cruise:

VNAV or PROGRESS page on PF side

LEGS page on PM side

Descent Preparation

PF	PM	
	Weather	
Review Alert Messages & Operational Notes	Recall and Review Alert Messages & Operational Notes	
Verify	FMC*	Approach Ref Page – V _{REF}
		DEP ARR – Runway and Approach
		NAV RAD Page – Set
		Descent Page – Descent Forecast
		Alternate Route – In RTE2 **
	Autobrakes ***	
Radio/Baro Minimums as required		
	Check Landing Performance	
Approach Briefing	Arrival Message ****	
Call “Descent Checklist”	Do “Descent Checklist”	
Fasten Seat Belt Sign *****		

* The first row of keys on the CDU does it all with NAV RAD being the exception.

** F/O will check fuel predictions for the destination and alternate to estimate any extra holding time available.

*** Normal Brake level selection is level 2. Use Brake level 3 or 4 for wet/contaminated runway.

**** Through ACARS to central dispatch (KHIASPK) for onward dissemination. In case of diversion, inform central dispatch about the diversion airfield, ETA and fuel (diversion report through ACARS).

***** Just prior to TOD, the PF shall call for the fasten seat belt sign to be cycled twice. This acts as a trigger for the cabin crew to prepare the cabin and passengers for landing.

Checklist	Call	Read	Verify	Respond
DESCENT	Pilot flying	Pilot monitoring	Both	Area of responsibility

Recall	Checked	PM
Notes	Checked	PF
Autobrake	___	PF
Landing data	VREF___, Minimums___	Both
Approach briefing	Completed	PF

Approach Briefing:

1. Weather and Notams.
2. STAR Procedures:
 - NAV Frequencies to be used
 - Routing and Constraints
 - Transition Level
 - MSA
3. Approach Procedures:
 - NAV Frequencies to be used
 - Approach and Minima
 - Transition Level
 - MSA
 - Terrain / Obstacles
 - Restricted and prohibited areas in descent and approach path
4. Go Around and Missed Approach Procedures:
 - ATC Procedures
 - A/C Procedures
5. Landing Runway Information
 - **D** – Dimensions (Length, Width, Distance beyond G/S)
 - **S** – Surface Condition
 - **L** – Lighting
6. Taxi In Routing and Parking Procedures
7. Miscellaneous:
 - Communication Failure Procedure
 - Type of Approach – Auto, Manual, ILS or Non ILS etc
 - Deviation from standard procedures
 - Specific duties due to special conditions affecting arrival

Descend Speed Schedule (If VNAV not in use)

M.84/310 knots up to FL100/10,000ft.

Thereafter 250 knots subject to ATC speed restrictions.

Descent and Approach Procedure

- 1) **T**en Thousand Feet
- 2) **T**ransition Level
- 3) **T**ilt of weather radar Auto or as required

PF	PM
CDU – PROG Page 1*	CDU – LEGS Page
	10,000 feet MSL Landing Lights L/R – ON Passenger Signs – ON
Transition Level – Set and Cross Check Altimeters	
Call “Approach Checklist” **	Do “Approach Checklist”
Deselect “ARPT” (EFIS Control Panel)	

* CPSI/BUL/12/19 Nov 7th, 2012

** At 10,000 feet or setting QNH whichever is lower

Checklist	Call	Read	Verify	Respond
APPROACH	Pilot flying	Pilot monitoring	Both	Area of responsibility

Altimeters — **Both**

Descent Planning

Losing airspeed can be difficult and may require a level flight segment. For planning purposes, it requires approximately 60 seconds and 6 NM to decelerate from 310 to 250 knots in level flight without speedbrakes. It requires an additional 50 seconds and 4 NM to decelerate to flaps up maneuver speed at average gross weights. Using speedbrakes to aid in deceleration reduces these times and distances by approximately 50%.

Extend the flaps when in the terminal area and conditions require a reduction in airspeed below flaps up maneuver speed. Normally select flaps 5 prior to the approach fix going outbound, or just before entering downwind on a visual approach. When flaps are extended, select the next lower speed just as the additional configuration drag takes effect. Delaying the speed selection causes an increase in thrust, while selecting the lower speed too quickly causes thrust to decrease, then increase.

Rate of Descent Restrictions

Below 5000 feet – 2000 fpm max

Below 2000 feet – 1000 fpm max

Altitude change of 1000 feet – 500 fpm max

Landing Procedure - ILS

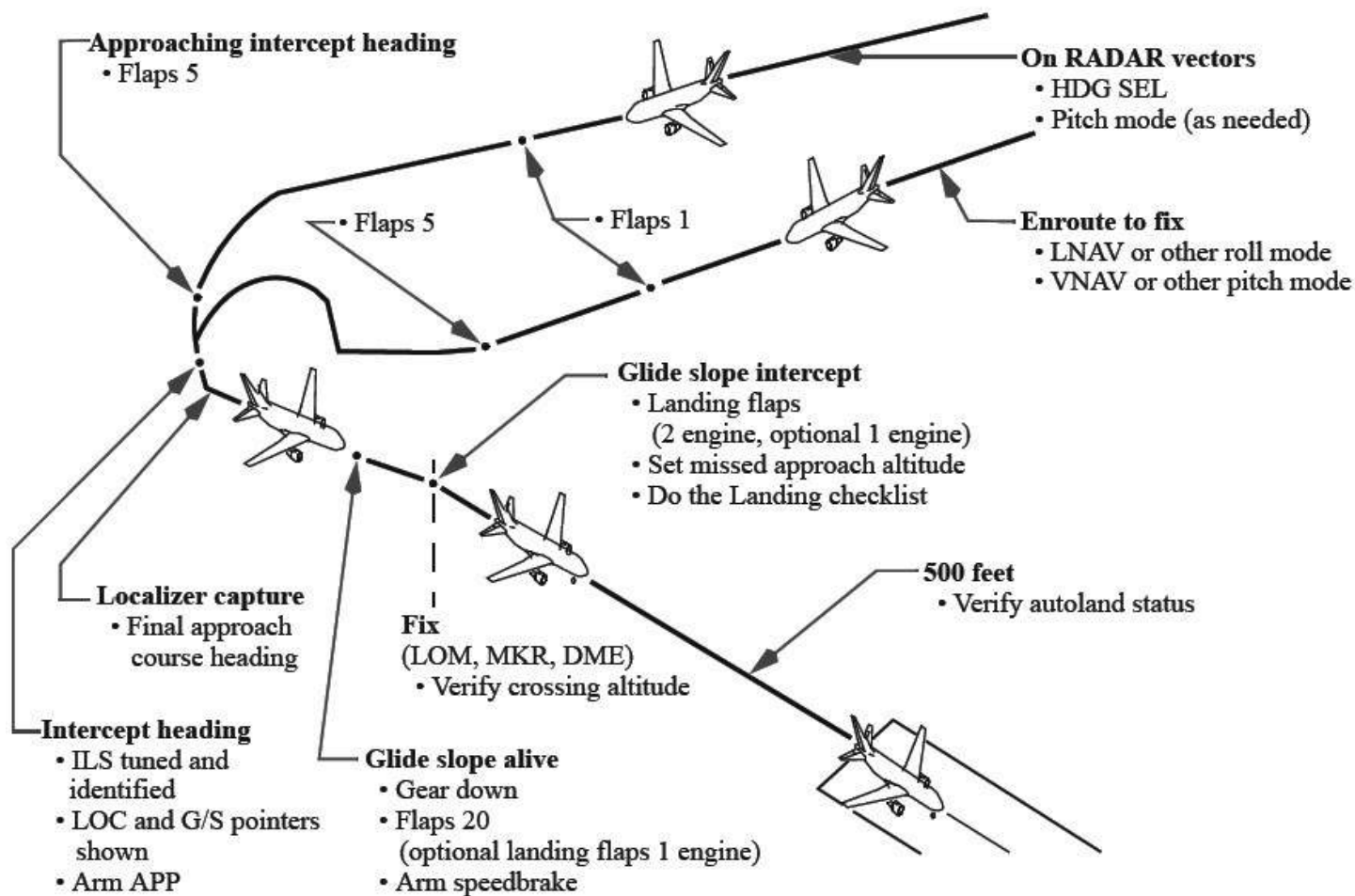
PF	PM
Call for Flaps as per the schedule *	Set Flaps
On intercept heading, verify: ILS Frequency (tuned & identified) LOC and G/S pointers	
Arm APP Mode	
HDG/TRK SEL or HOLD mode **	
CDU – PROG Page 2	
Check	“Localizer Alive”
Check	“Localizer Capture”
Check	“Glide Slope Alive”
Call: “Gear Down Flaps 20”	
Arm Speedbrakes (Captain)	Set Gear and Flaps Landing Lights ON Cabin Announcement
Check	“Glide Slope Capture”
Call for Landing Flaps ***	Set Flaps
Set missed approach altitude	
Call “Landing Checklist”	Do “Landing Checklist”
Check	“Radio Altimeter Alive” (2500 RA)
Check	“Outer Marker / Fix ____ Ft”
1000 feet RA 500 feet RA (Auto Land status) Approaching Minimums Minimum **** Landing / Go-Around	

* Start deceleration from 250 kts to Flaps 5 maneuvering speed with Flaps 5 prior to localizer capture. When Flaps are extended, select the next lower speed just as the additional configuration drag takes effect.

** LNAV (if used to intercept the final approach course) might parallel the localizer without capturing it.

*** If not in adverse conditions (to conserve fuel or to accommodate ATC speed requests), intercept the glide slope with gear down and flaps 20 at flaps 20 speed. Approaching 1,000 feet AFE, select landing flaps. For noise sensitive areas, use the technique above but delay extending the landing gear until 1500 feet AFE.

**** Call if there is no auto callout. Also call 100, 50 and 30 RA in case of no auto voice callout.



Checklist	Call	Read	Verify	Respond
LANDING	Pilot flying	Pilot monitoring	Both	Pilot flying

Speedbrake **ARMED** **PF**
 Landing gear **DOWN** **PF**
 Flaps **—** **PF**

Go-Around and Missed Approach Procedure

Minimums:

1. TOGA and Flaps
2. Attitude and Go-around Thrust

+ Climb:

1. Gears Up

400 Feet:

1. Roll Mode
2. Route Tracking

1000 Feet:

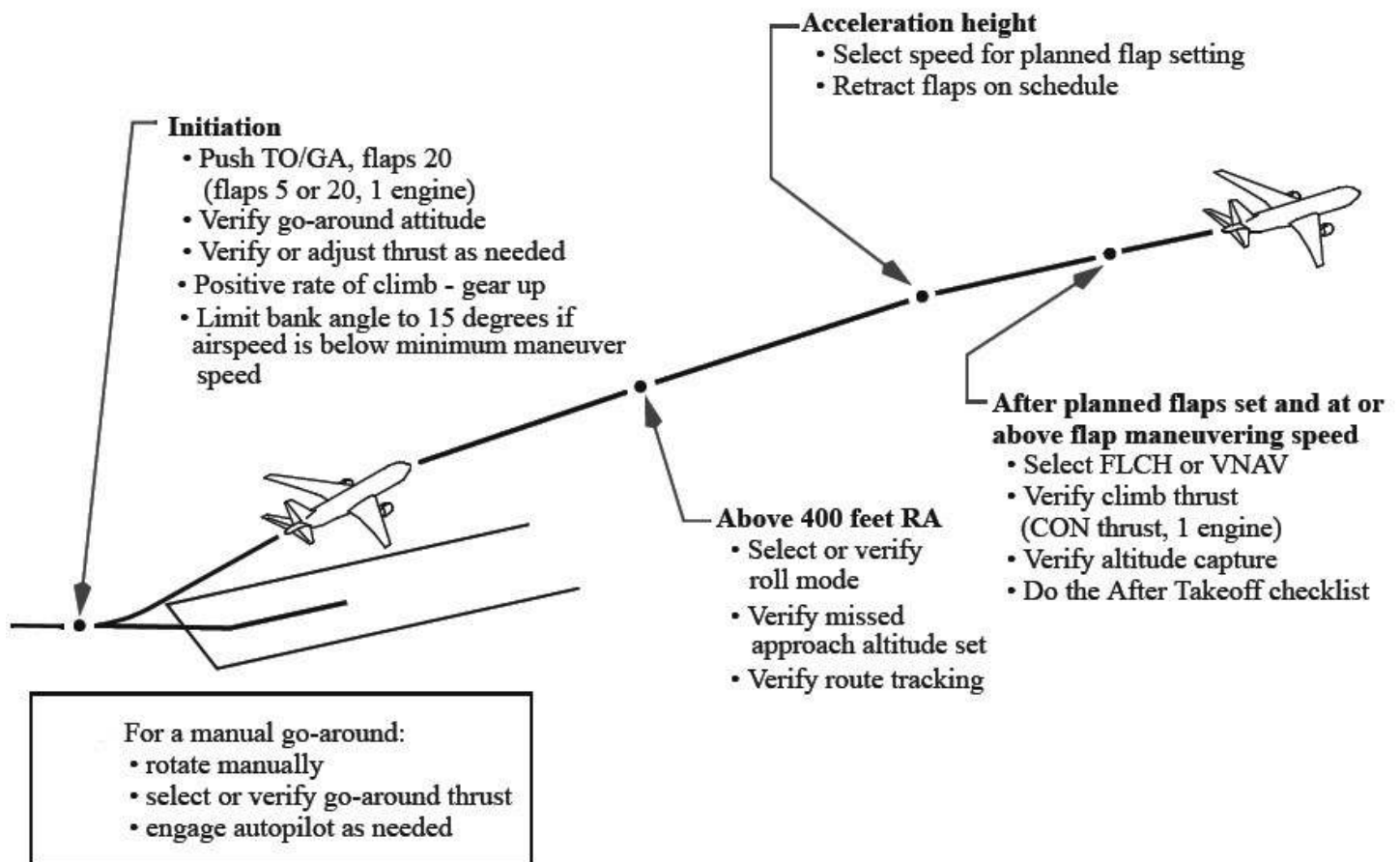
1. Acceleration and Flap retraction
2. Climb Mode and Thrust
3. Climb to Missed Approach Altitude
4. Checklist

PF	PM
Push TOGA Call "Flaps 20"	Set Flaps 20
Verify Go-Around Attitude and Thrust Increase*	
	Positive rate of climb Call "Positive Rate"
Verify and Call "Gear Up"	Set Gear up
400 feet RA – Select/Verify a Roll Mode**	Verify Missed Approach Altitude Set
Verify Missed Approach Route is Tracked	
At Acceleration Height (1000 feet) Set maneuvering speed for planned flaps	Retract Flaps ***
After flap retraction FLCH or VNAV Climb	
Verify Climb Thrust	
Verify Missed Approach Altitude Capture	
Call "After Takeoff Checklist"	Do "After Takeoff Checklist"

* PM will adjust the thrust if not sufficient for go-around.

** Limit bank angle to 15 degrees if airspeed is below minimum maneuver speed.

*** As per schedule (At display 20 select flaps 5 Ref: FCTM 3.30)



Low Altitude Level Off - Low Gross Weight

To prevent an altitude and/or airspeed overshoot, the crew should consider doing one or more of the following:

- Use the autothrottle
- Press TO/GA switch once to command thrust sufficient for a 2,000 fpm climb rate
- If full go-around thrust is used, reduce to climb thrust earlier than normal
- Disconnect the AFDS and complete the level off manually if there is a possibility of an overshoot
- If autothrottle is not available, use manual thrust control to manage speed and prevent flap overspeed.

Go-Around after Touchdown

If a go-around is initiated before touchdown and touchdown occurs, continue with normal go-around procedures. The F/D go-around mode will continue to provide go-around guidance commands throughout the maneuver.

If a go-around is initiated after touchdown but before thrust reverser selection, auto speedbrakes retract and autobrakes disarm as thrust levers are advanced. The F/D go-around mode will not be available until go-around is selected after becoming airborne.

Once reverse thrust is initiated following touchdown, a full stop landing must be made.

Non-ILS Approaches

1. Setting up the Approach

Whenever constant angle approaches are available in the FMC data base, they will be flown using VNAV PATH. VNAV should be used only for approaches that have one of the following features:

- A published **GP Angle on the LEGS** page for the final approach segment
- An **RWxx waypoint** coincident with the approach end of the runway
- A **missed approach waypoint** before the approach end of the runway, (e.g., MXxx).

These features permit construction of a normal glide path. VOR approaches with the missed approach point on the LEGS page beyond the runway threshold and circling only approaches do not have these features. Do not manually build the approach or add waypoints to the procedure (see “on approach logic” FCOM 11.31.30). For procedures where both the FAF and FAF are coded with “at or above” altitude constraints, the crew should **consider revising the FAF altitude constraint to “at” (hard constraint)**. This enables a shallower path before the FAF, permitting a normal deceleration for flap and gear extension. When appropriate, make **cold temperature altitude corrections** by applying a correction from an approved table to the waypoint altitude constraints. If required to use MDA(H) for the approach minimum altitude, the barometric minimums selector should be set at **MDA + 50 feet** to ensure that if a missed approach is initiated, descent below the MDA(H) does not occur during the missed approach. Jeppesen will publish DA(H) instead of MDA(H) for CDFA approaches and will not use an add-on when publishing a DA(H). To use or not use an add-on is still the operators responsibility.

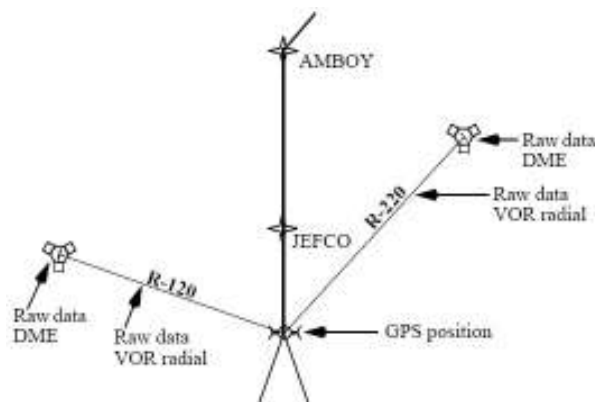
Where constant angle approaches are not available, an overlay approach procedure may be used, if available. Another approach having the same plan view may be selected. For example, an ILS procedure might be selected if the plan view (route) is identical to an NDB approach. In this case, waypoint altitudes must be checked and modified as required. When an approach is flown by this “overlay” method, raw data should be monitored throughout the approach to assure obstacle clearance. **Note:** If an NDB approach for the desired runway is in the database, an overlay approach should not be used. When no procedure is available from the FMC arrival page, approaches may be carried out by selecting frequency & course in the NAV radio page and utilizing HDG SEL/TRK SEL with VS/FPA.

2. RNP Requirement

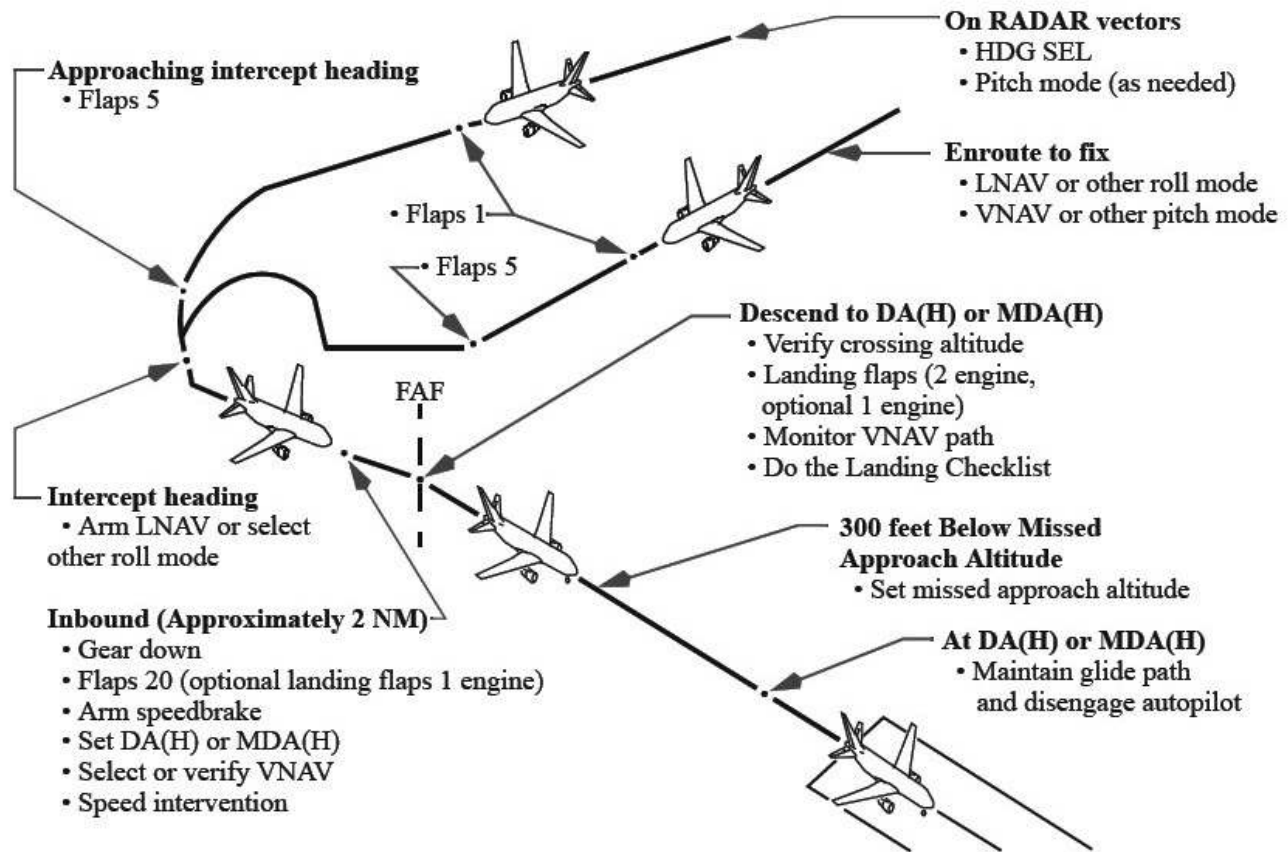
Approach Type	RNP
NDB, NDB/DME	0.6 NM
VOR, VOR/DME	0.5 NM
RNAV	0.5 NM
RNAV (GPS)/(GNSS)	0.3 NM

3. Raw Data Monitoring Requirement

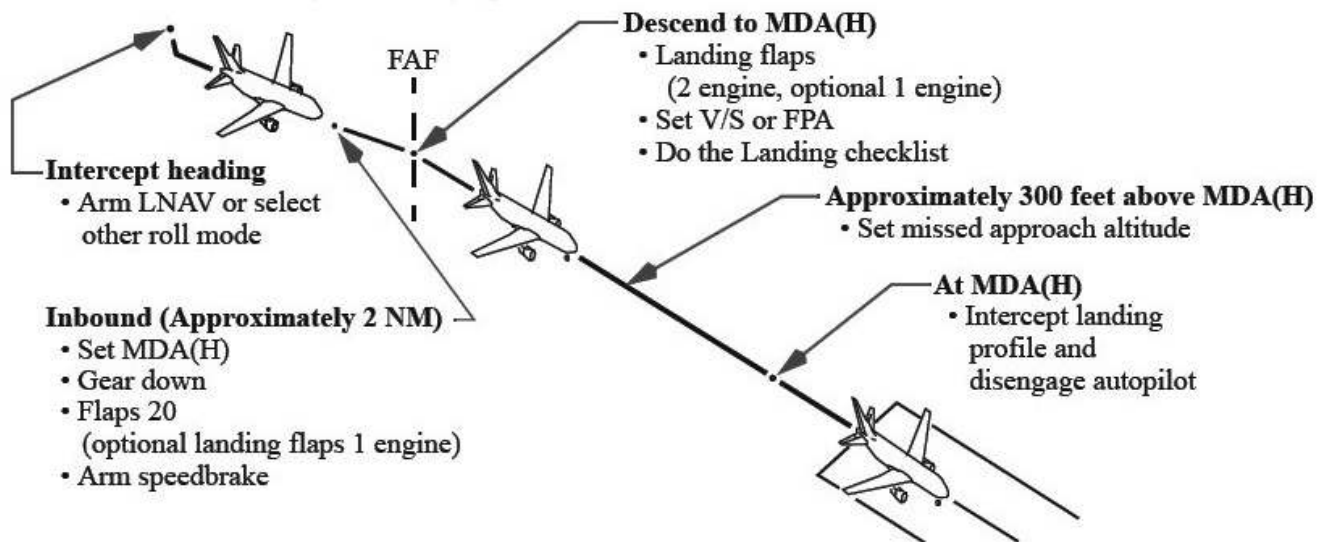
- Push the POS switch on the EFIS control panel and compare the displayed raw data with the navaid symbols on the map e.g. the VOR radials and raw DME data should overlay the VOR/DME stations shown on the MAP and the GPS position symbol should nearly coincide with the tip of the airplane symbol (FMC position).
- Display the VOR and/or ADF pointers on the map display and use them to verify your position relative to the map display.
- Compare airplane position on the map with ILS, VOR, DME, and ADF systems to detect possible map shift errors.



Instrument Approach using VNAV:



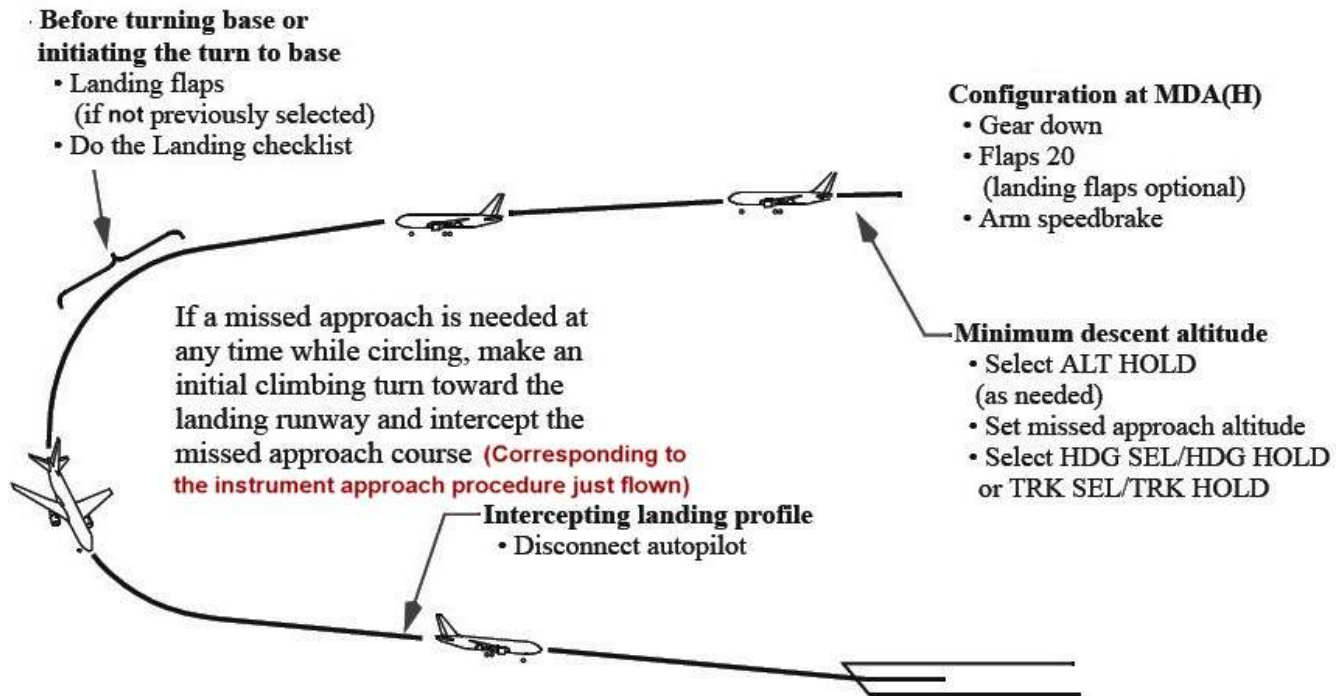
Instrument Approach using V/S or FPA:



Approximately 300 feet above the MDA(H), select the missed approach altitude. This is done to use the guidance of the altitude range arc during the approach and to prevent altitude capture and destabilizing the approach. Unlike an approach using VNAV, the occurrence of VNAV ALT is not an issue. Since there is no below path alerting, keeping the MDA(H) set as long as possible is recommended to help prevent inadvertent descent below MDA(H).

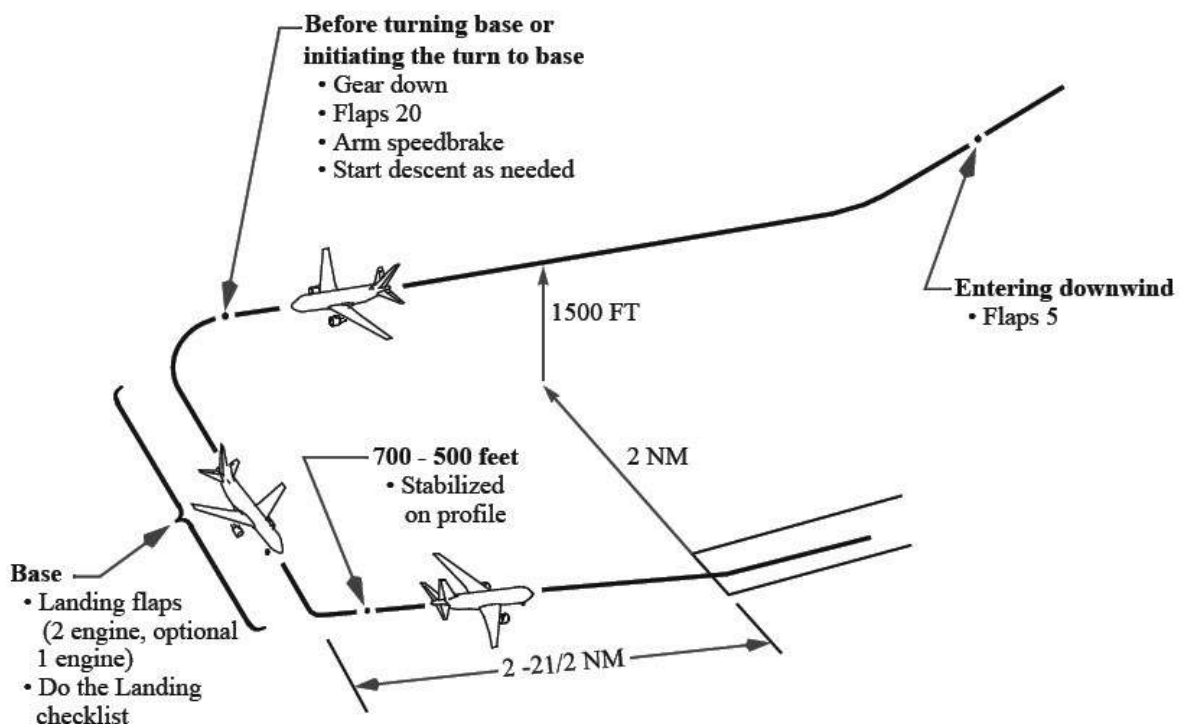
Leaving the MDA(H), disengage the autopilot. Turn both F/Ds OFF, then place the PM's F/D ON. This eliminates unwanted commands for the PF and allows continued F/D guidance for the PM in the event of a go-around when pitch or roll mode is changed.

Circling Approach:



- Approach category 'C' or 'D' according to actual circling speed.
- Use VNAV, V/S, or FPA modes to descend to MDA. APP mode for descent is not recommended because AFDS does not level off at MCP altitude and exiting the APP mode requires initiating a go-around or disengaging the autopilot and turning off the flight directors.
- Angle off 45 degrees to the runway heading, take time 30 seconds then join downwind.
- Abeam threshold, start time for 20 seconds (for every 500 feet).
- Minimum height at the end of final turn is at 400 ft AAL with flaps 30° / VAPP obtained.
- Wings must be level by 300 ft AAL
- After intercepting the visual profile, cycle both F/D to OFF, and select the PM F/D to ON.

Visual Pattern:



Landing Roll Procedure

- 1) Speedbrakes
- 2) Autobrakes
- 3) Reversers
- 4) 60 Knots

PF	PM
Verify Speedbrake Lever UP	Call "Speedbrakes UP" or "NOT UP"
Verify Autobrake Operation	
	REV Green – Call "Reversers Normal" REV Amber or no indication – Call: "No Reverser Left/Right Engine" "No Reversers"
	Call "60 Knots"
Reverse Idle	
Before taxi speed – Disarm Autobrakes	
Before turning off runway: Disconnect Autopilot	

After Landing Procedure

PF	PM
Captain positions speed brake lever down	
	APU – Start
	Eng Anti-ice – As required
	Taxi Lights – On Other Lights – As required
Weather radar - OFF	
	Autobrake – Off
	Flaps – UP
	Transponder – As Required

Engine cool down: Run the engines for at least 3 minutes. Use a thrust setting normally used for taxi operations.

Shutdown Procedure

Capt	F/O
	Call “APU Running” *
Parking Brake – Set	
	Electrical Power – Set **
Fuel Control Switches – Cutoff	
	Cabin Announcement
	Seatbelts – OFF
	Hydraulic Panel – Set ***
	Fuel Pumps – OFF
	Beacon Light – OFF
F/D – OFF	F/D – OFF
	Transponder – STBY
EFB Close Flight – Select	EFB Close Flight – Select
	Status Message – Check ****
Parking Brake – Release	
	APU – As required *****
Call “Shutdown Checklist”	Do “Shutdown Checklist”
COMM - Company Menu - Send “Arrival Report”	

* Before the aircraft reaches the parking bay

** Prior to engine shutdown ensure “APU RUNNING” message on EICAS or availability of Ground power.

*** Depressurize the right system last to prevent fluid transfer between systems.

**** Disregard EICAS alert and status messages displayed during the PFC self test after hydraulic shutdown. Wait approximately 3 minutes after HYD PRESS SYS L+C+R message is shown before recording status and alert messages in the maintenance log.

***** APU OFF if transit time is more than 1hr 30min unless there is an airport restriction.

Checklist	Call	Read	Verify	Respond
SHUTDOWN	Captain	First officer	Both	Area of responsibility

Fuel pumps **Off** **FO**
Flaps **UP** **FO**
Parking brake **—** **CAPT**
Fuel control switches **CUTOFF** **CAPT**
Weather radar **Off** **Both**

Secure Procedure

Capt	F/O
	ADIRU Switch – OFF
	Emergency Lights Switch – OFF
	Pack Switches – OFF
EFB Display – OFF	EFB Display – OFF
Call “Secure Checklist”	Do “Secure Checklist”

Checklist	Call	Read	Verify	Respond
SECURE	Captain	First officer	Both	Area of responsibility

ADIRU **OFF** **FO**
Emergency lights **OFF** **FO**
Packs **OFF** **FO**

Disclaimer: "B777 Normal Procedures" are personal notes of the undersigned. These notes do not sanction any pilot to violate his/her Company's Standard Operating Procedures, Aircraft Manuals or Manufacturer's Recommendations. Anyone intending to use these notes should provide* an [email address](#) so that he/she can be informed about significant changes or corrections in this article.

* www.TheAirlinePilots.com/b777articleupdatenotification.htm

www.TheAirlinePilots.com

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